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Contribution to study of the natural system of *Acarina* of the genus *Haemogamasus* Berlese, 1889 (*Gamasides*)

Przyczynek do poznania naturalnego układu roztoczy
z rodzaju *Haemogamasus* Berlese, 1889 (*Gamasides*)

Haemogamasidae belong to the typically parasitic *Acarina*, feeding on the blood of small vertebrates (mainly mammals). *Haemogamasidae* constitute a compact group covering similar forms, which may be easily distinguished from other *Gamasides*. This family divides into three or four genera: *Haemogamasus* Berlese, 1889, *Euhaemogamasus* Ewing, 1933, *Acanthochela* Ewing, 1933, and *Ischyropoda* Keegan, 1951. The present paper will deal with the two former genera.

The following are the general characteristics of genus *Haemogamasus* sensu Berlese, 1889.

The body covered with dense chaetae; entire dorsal shield in both sexes; entire ventral shield in males only. In females two types may be distinguished: one with normal and one with paranormal chaetotaxy of sternal shield. — Very characteristic cut of tectum edge („wie zügelnde Flammen” according to Vitzhum's definition); chelicerae of females with or without jags; maxillae either strongly chitinized, sufficiently sharp and wide at the base, or very weak, membrane-like, their shape unique. — The legs, in males, either provided with hooks (the femur, praetibia, tibia and tarsus of the second pair), or with ordinary chaetae only. — Some 40 species and subspecies had been described up to 1955.

Ewing, 1933, singled out of the former *Haemogamasus* Berl. his own genus *Euhaemogamasus* by grouping together forms with sternal shield chaetotaxy typical of all the *Gamasides* i.e. the forms with 3 pairs of sternal chaetae $St_1 - St_3$, leaving, as trunk of the maternal kind, the forms with paranormal chaetotaxy (30 to 40 pairs of „supplementary chaetae”). In that way the genera *Haemogamasus* sensu Ewing 1933 and *Euhaemogamasus* Ewing 1933 have been formed.

In order to verify the conception of Ewing I grouped all the antithetic characteristics of the genus *Haemogamasus* Berlese 1889:

♀♀

1. Sternal shield chaetotaxy typical of all the *Gamasides*.
- Paratypical sternal shield chaetotaxy (up to 30 pairs of supplementary chaetae).
2. Cheliceral claws provided with teeth.
- Same without teeth.
3. Smooth body chaetae only.
- Various numbers of feather-like body chaetae.
4. Strongly chitinized maxillae, easy to identify even under slight microscopical magnification.
- Weak maxillae, difficult to identify even under immersion (markedly atypical shape).

♂♂

1. Smooth body chaetae only.
- Some chaetae are feather-like.
2. Second pair of legs provided with spikelets (= armed).
- All legs covered with ordinary chaetae only.

If, at first, only the ♀♀ of eurasiatic species are considered tables may be composed in which the material is segregated into two antithetic groups: „a” always denoting the thesis, and „b” — antithesis; in subsequent discussion those symbols will be used to denote the specimen belonging to one of the two possible groups (see Table I).

Table I

Division of *Haemogamasus* Berlese ♀♀ after sternal shield chaetotaxy

a) Species with normal chaetotaxy (St ₁₋₃)	b) Species with para-normal chaetotaxy
<i>H. pontiger</i> (Berlese).	<i>H. hirsutus</i> Berlese
<i>H. horridus</i> Michael.	<i>H. hirsutosimilis</i> Willm.
<i>H. nidi</i> Michael.	<i>H. kusumatoi</i> Asanuma
<i>H. nidiformes</i> Bregetova.	<i>H. ivanovi</i> Bregatowa
<i>H. zachvatkini</i> Bregetova.	<i>H. mandschuricus</i> Vitzthum
<i>H. serdjukovae</i> Bregetova.	<i>H. ambulans</i> (Thorell)
<i>H. liponyssoides</i> Ewing.	<i>H. citelli</i> Bregetova

Thus two groups of ♀♀ have been obtained which differ in one characteristic, easy to determine; Ewing seems therefore to be correct. This proves to be illusion however after further investigation because: 1) forms at various development stages never are provided

with a paranormal sternal shield chaetotaxy; 2) there are species in which this characteristic is a part of their individual variability; 3) the characteristic discussed is not genetically connected with other characteristics dividing the ♀♀ material into groups; this is evident from Table II, in which the material is sub-divided in a completely different way as it is in Table I.

Table II

Females division in respect of chelicerae-claws armature.

(a) resp. (b) denote the group into which the species was included in the Table I.

a) Chelicerae-claws armed	b) Chelicerae-claws unarmed
(a) <i>H. pontiger</i> (Berlese)	(b) <i>H. hirsutus</i> Berlese
(a) <i>H. horridus</i> Michael	(a) <i>H. liponyssoides</i> Ewing
(a) <i>H. nidi</i> Michael	
(a) <i>H. nidiformes</i> Bregetova	
(a) <i>H. serdjukovae</i> Bregetova	
(?) <i>H. dauricus</i> Bregetova*	
(b) <i>H. hirsutosimilis</i> Willm.	
(b) <i>H. kusumatoi</i> Asanuma	
(b) <i>H. ivanovi</i> Bregetova	
(b) <i>H. mandschuricus</i> Vitzl.	
(b) <i>H. ambulans</i> (Thorell)	
(b) <i>H. citelli</i> Bregetova	

* ite in Table I not defined

Table III

Females division in respect of body and leg chaetae structure. Letter symbols refer to the two previous tables.

a) feather — like chaetae	b) non feather — like chaetae
(a/a) <i>H. pontiger</i> (Berlese)	(b/b) <i>H. hirsutus</i> Berlese
(a/a) <i>H. nidi</i> Michael	(b/a) <i>H. hirsutosimilis</i> Willm.
(a/a) <i>H. nidiformes</i> Bregetova	(b/a) <i>H. kusumatoi</i> Asanuma
(a/a) <i>H. serdjukovae</i> Bregetova	(b/a) <i>H. ivanovi</i> Bregetova
(? /a) <i>H. dauricus</i> Bregetova	(b/a) <i>H. mandschuricus</i> Vitzl.
(a/ ?) <i>H. zachvatkini</i> Bregetova	(a/b) <i>H. liponyssoides</i> Ewing
(b/a) <i>H. ambulans</i> (Thorell)	(a/a) <i>H. horridus</i> Michael
(b/a) <i>H. citelli</i> Bregetova	

Comparison of the two tables shows the genus *Haemogamasus* Berl., 1889, to divide not into two, but into four groups of species

which obviously invalidates Ewing's supposition. Besides, application of further taxonomic characteristics as criterion of such a division in smaller unities clouds the picture still more (see Table III).

In respect of simultaneous presence of characteristics the following types realized in fact exist:

Pattern	Chaetotaxy ST	Chelicerae claws	Body chaetae
a/a/a	normal	armed	feather-like
a/a/b	normal	armed	smooth
a/b/b	normal	unarmed	smooth
b/b/b	paranormal	unarmed	smooth
b/a/b.	paranormal	armed	smooth
b/a/a	paranormal	armed	feather-like

It should however be stressed that the latter characteristic — feather-like chaetae — has only an insignificant taxonomic value as the females, in this respect, are related in a different way to the males. This is made obvious in Table IV.

Table IV

Males division in respect of body and leg chaetae structure (feather-like). A and B denote the group into which the female of the same species was included when the same division criterion was used; other symbols as above

a) feather-like chaetae	b) non feather-like chaetae
(a/a/A) <i>H. pontiger</i> (Berlese)	(b/b/B) <i>H. hirsutus</i> Berlese
(a/a/A) <i>H. nidi</i> Michael	(b/a/B) <i>H. hirsutosimilis</i> Willm.
(a/a/A) <i>H. nidiformes</i> Bregetova	(a/a/B) <i>H. horridus</i> Michael
(a/a/A) <i>H. serdjukovae</i> Bregetova	(a/b/B) <i>H. liponyssoides</i> Ewing
(?/a/A) <i>H. dauricus</i> Bregetova	
(a/?/A) <i>H. zachvatkini</i> Bregetova	
(b/a/A) <i>H. ambulans</i> (Thorell)	
(b/a/A) <i>H. citelli</i> Bregetova	
(b/a/B) <i>H. mandschuricus</i> Vitzl.	
(b/a/B) <i>H. ivanovi</i> Bregetova	

This comparison shows that males with non feather-like chaetae do not form a group of species. Besides, by comparing with Table III, the sexual dimorphism is revealed within the examined characteristic which hitherto was considered a taxonomic criterion. Consequently application of this test would result in females being classed in a different *Haemogamasus* sub-group than the males. But there is still one point. The females of *H. horridus* Michael are with regard to different characteristics similar to different

females of the same genus, and still it never seemed necessary to contrast them with all females of *Haemogamasus*. The latter criterion examined (legs provided with hooks) however contrasts the males belonging to this species with all the rest of *Haemogamasus* sp. sp. ...

It seems therefore that at least the characteristic which were considered here could not form a basis for subdividing the genus *Haemogamasus* into smaller natural taxonomic units. On the other hand however it is precisely those criteria which have emerged in the course of analysis:

a) ephemeral groups of species

b) relatively compact group of species with pattern (a/a/a/a) ♂ — *H. pontiger* (Berl.), *H. nidi* Mich. ... — to which *H. hirsutus* Berl. should be opposed; to describe the latter the antithetic formula (b/b/b/b) ♂ may be used.

Thus the genus *Haemogamasus* Berlese would split into three species groups: 1) *H. pontiger* (Berl.) + *R. nidi* Mich. type, 2) *H. hirsutus* Berl. type, the exact opposite of the former, and 3) the mixed up type, uniting species with characteristics of the 1-st and the 2-nd group.

My own results although concerning a small number of species do nevertheless throw some light on those particularly intricate relations.

Material and methods

The material has been collected by the staff of the Acarologic Laboratory, Department of Medical Parasitology, Polish Institute of Hygiene, during an expedition to the Białowieża National Park organized by the Department of Virusology. The aim of the expedition was to investigate the chief role the *Acarina* play in carrying infection diseases. The material was mainly collected from *Muridae* [*Apodemus flavicollis flavicollis* Melchior 1844 and *Clethrionomys glareolus* (Schreber 1780)] as well as from other small forest mammals, in considerably smaller proportions. The family of *Haemogamasidae* was represented in this collection exclusively by the genus *Haemogamasus* Berlese including the following species:

<i>Haemogamasus nidi</i> Mich.	51 per cent
<i>Haemogamasus hirsutus</i> Berl.	21 per cent

<i>Haemogamasus horridus</i> Mich.	8 per cent
<i>Haemogamasus hirsutosimilis</i> Willm.	3.5 per cent
Deutonymphs (species difficult to define)	10.5 per cent

All collected *Gamasidae* were subject to detailed morphological analysis (Kozłowski, Żukowski, 1958). *Acarina* have been preserved in Oudemans fluid (which proved useless where such delicate forms as *Haemogamasidae* are concerned; they then were cleared in milk acid heated until it started to steam, and finally, after cooling down they were inbedded into Faure-Berlese fluid. This considerably simplified method (which eliminates preparing of gnathosoma) has many disadvantages (Kozłowski 1955), but is very quick. This fact was taken into consideration in the particular case as there was a collection of some 4000—4500 individuals of different *Acarina* awaiting preparation.

Gnathosoma of *Haemogamasus* Berlese

Gnathosoma of *Haemogamasus* sp. sp. do not differ in their structure, from the „parasitiformes-pattern” as defined by Börner, and later by Vitzhum. In further discussion the nomenclature introduced by Vitzhum 1940, and applied by Nelzina 1951 will be used, taking into consideration my own critical remarks in this respect (Kozłowski, 1955).

The oral apparatus of these *Acarina* is made up, like the whole body, of fine and rather flimsy chitin which makes it very difficult to identify particular appendices. The dorsal part pressed in between the coxae I, and dorsally covered by the dorsal edge of gnathosoma constitutes about 1/3 of the total body length in *H. nidi* Mich. (♀); the ratio of the width of the latter (measured at the base) to that of idiosoma (measured at IV pair of legs level) is 1 : 3 too.

Gnathosoma structure in *Haemogamasus* sp. sp. is very complicated and, unfortunately, it proved impossible to disentangle it definitively. If considered from below, the ventral surface of the coxopodit may be seen, usually with three pairs of chaetae protruding. A perfectly well formed hypostoma (with no hooks, usually present here) appears between maxillary lobes set far apart (André 1949). Instead, the laciniae hypostomi are uncommonly developed with an characteristic enlargement and „feathering” in their lower part. Their fanciful arrangement may often be seen in preparations.

Some species are characterized by strong maxillae which either disappear completely, in some forms, or in others, mutate to form membraneous formations, unknown in other *Acarina*, and which seem to be rolled around a long axis. Those maxillae seem to have two branches in some species (malae interiores et exteriores sive galeae) but, as a rule in these forms each maxilliferous lobe is provided with two transparent chitin lobes most probably coalescent in some forms and, possibly, loose — in others.

Species without well formed, strongly chitinized proper maxillae are provided with a whole complex of mouth appendices transformed into a sharp proboscis, conical in shape. This proboscis is, in ♀♀, fortified with powerful chelicerae provided with teeth.

As regards coxopodit structure sexual dimorphism is generally clearly distinguished, but there are exceptions to this rule. The chelicerae of males and females differ considerably and especially so in some males possessing particularly modified chelicerae.

Haemogamasus nidi Michael, 1892

The specimens of ♀♀ and ♂♂ collected in 92—93 per cent of the cases did not differ from the key descriptions. Chaetotaxy of sternal shield was typical (St₁ — St₃), the chelicerae-claws were provided with teeth; body and legs covered with chaetae with distinct „feathering” both in males and females; — chelicerae of males were distinctly different from those of females, their claws, however, were not markedly modified, still functional. Gnathosoma was provided with powerful, wide and strongly chitinized maxillae in both sexes, well visible even if not very magnified under the microscope. Lacinae hypopharyngis in ♀♀ were not very distinct but relatively wide and „feathered” at their lower part (on dorsal side); they are elongated at the apex, almost filiform. Due to their disposition it was very difficult to make out their proper structure in my own preparations. Some of them looked like ventrally opened wide grooves, while other resembled a cannula with an elongated ventral apical filiform edge.

It should be stressed that some 7 or 8 per cent of our female material distinctly resembled species „*H. zachvatkini* Bregetova, 1955” as regards the structure of the appendices on chelicerae, and the disposition of idiosoma shields. As regards other characteristics however (length: width ratio of the body, shape of inguinalia,

structure of postanal chaetae) they more resembled *H. nidi* Michael. Besides, diagnosis of species „*H. zachvatkini* Bregetova” is based on such fine points that one may never be sure. I suppose it is safer to consider the species group created by that author (*H. zachvatkini*, *H. serdjukovae*, *H. nidiformes*) as variations of the classical Michael's species till careful statistical biometric examinations are carried out because they differ too insignificantly to make it possible for the actual systematic analysis to rely on such differences.

„New species” — which later proved to be analogous with *H. nidi* Mich. and differed from the latter within the usual range as in fluctuation have been described in literature relatively often

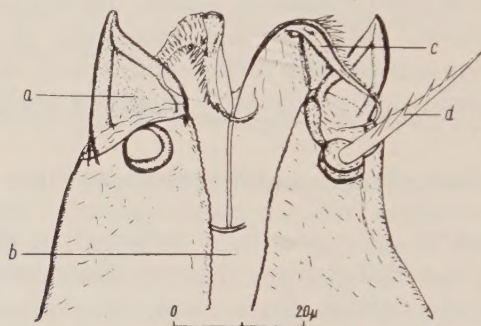


Fig. 1. *Haemogamasus nidi* Mich. ♀. a — maxilla, b — hypostoma, c — laciniae hypostomi, d — hypostomal chaeta.
Prep. No 1310, orig.

due to this particular species being very rich in variations. Let us recall in this respect the diagnoses of Ewing, 1925, 1933 or those of Keegan, 1945, which were refuted, among other authors, by Bregetova herself.

A doubtlessly peculiar form described by Ewing (1925), and named by him „*Haemogamasus liponyssoides*”, seems also to resemble the *H. nidi* Mich. having a very similar gnathosoma structure according to data given by Bregetova, 1953, a. Unfortunately a good and very interesting drawing in her publication was erroneously annotated; for instance what is understood under „interior maxillary lobes” if we consider that gnathosoma of parasitiformes-pattern has only one pair of maxilliferous lobes which simply constitute the ventral side of the coxopodit? It is even difficult to imagine the morphological conditions suggested by the

author. According to my own interpretation it is simply a twofold hypostom top covered with chaetae i. e. the already mentioned base of laciniae hypostomi; see picture of gnathosoma of *H. nidi* Mich. (Fig. 1).

Haemogamasus hirsutus Berlese, 1889

Specimens collected do not diverge from key descriptions. Paratypical sternal shield chaetotaxy (up to 37 pairs of chaetae); chelicerae-claws not armed; no body and leg chaetae are „feathered” in either sexe; males and females cheliceres markedly different, but only slightly modified, still, functional. Coxopodit of females extremely difficult to make out; there is a narrow groove-like chitinous lobe on its top, which probably is coalescent with a far stronger chitinous ledge, possibly also groove-like in form. Because of its transparency and disposition the latter is very difficult to discern — in spite of its considerable size — and may be seen only under immersion; even then its dimensions are difficult to establish.

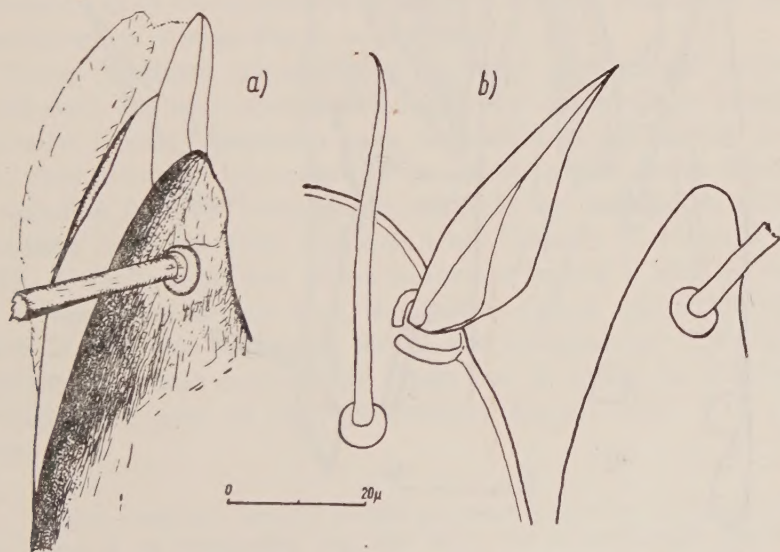


Fig. 2. *Haemogamasus hirsutus* Berl. ♀. a — detail of gnathosoma homologic with part represented in fig. 1; laciniae hypostomi are omitted; identification of proper maxillae very difficult (completely disappeared maxillae?), b — cheta of second member of pedipalpus, a — prep. No 1295 completed by prep. No 1312, b — prep. No 1285, orig.

This ledge begins at the outside edge of the maxilliferous lobe although, most probably, it is coalescent with its dorsal surface. The whole formation is laterally covered by a very complex chitinous structure scarcely visible due to its transparency. The latter proved impossible to make out. Any way there is no question here of proper maxillae as known in *Gamasidae* and which usually are easily seen even under the slightest microscope magnification.

Male coxopodit is no less complicated; it is still more difficult to disentangle as it looks somewhat different in different positions. At a glance long, strong laciniae widened at their lower part, and covered with chaetae may be seen which most probably are related with the hypostoma. The laciniae are unusually characteristic in

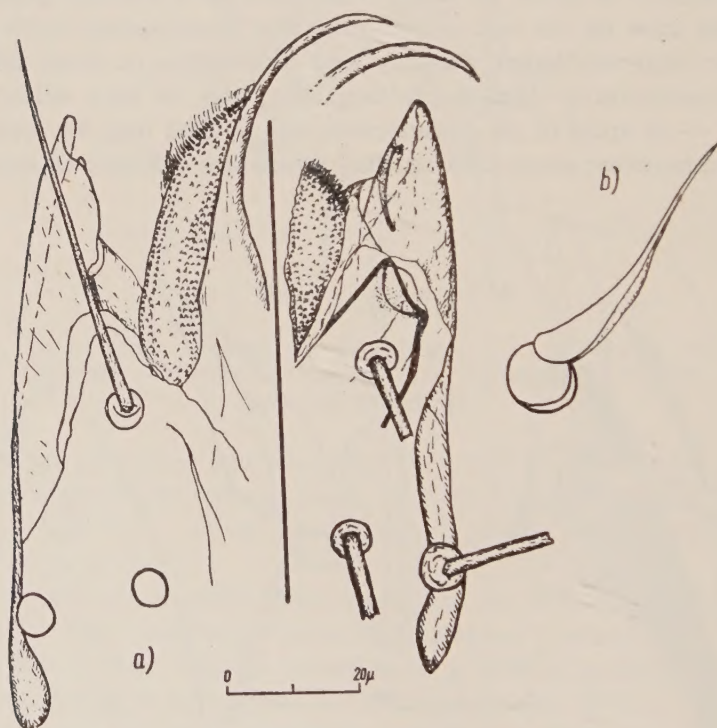


Fig. 3. *Haemogamasus hirsutus* Berl. ♂. a — two gnathosoma details (coxopodit branches, left and right) in somewhat different positions; the two parts are therefore exactly homologous both between themselves and with systems represented in fig. 1 and 2; proper maxillae are difficult to be doubtlessly defined here too. b — chaeta of second member of pedipalpus (spread). a — prep. No 1296 and No 1299, b — prep. No 1296, orig.

shape, different from those in other forms. An unusual formation appears on the fine maxilliferous lobe. Due to its dovetailing with the coxopodit it may be identified as „maxilla”. In some positions its structure appears ledge-like, the chitin lobes seemingly rolled around a long axis. In other preparations simply a cone may be seen, reinforced with a ledge-like chitin protuberance. And once again, the maxillae of males are absolutely atypical their base being grown over by a chitin formation impossible to identify and which, possibly, is coalescent with the main trunk of the „maxilla”. Besides the marked sexual dimorphism is to be pointed out in the system discussed*. (See Fig. 2 and 3).

Haemogamasus horridus Michael, 1892

Specimens we have collected do not differ from key descriptions. Sternal shield chaetotaxy typical ($St_1 - St_3$); chelicerae claws armed with teeth; body and legs, in both sexes, covered exclusively with non „feathered” chaetae only; male chelicerae different from those of females, their claws distinctly modified but still functional. Sexual dimorphism of coxopodits is insignificant.

Strong tubiform formations with short „feathering” from the dorsal part, are very obvious when the oral apparatus is considered ventrally. Those formations may be identified as laciniae hypostomi; they are much more distinct as usually in this genus. Structure of maxillae is very complicated, difficult to distinguish although conditions here are quite different from those in *H. hirsutus* Berlese. A weak chitin leaf rolled to form a groove is situated on the top of the maxilliferous lobe; the groove covers another formation which is fine too, but much larger and complicated. The latter is probably the main perforating organ but it would be difficult to identify with any of the oral organs known from Börner's description.

* On this occasion I want to rectify the error committed by Bregetova, 1956. There is an illustration (fig. 324) on p. 150 of her paper, and on the next page a description of the first free pedipalp of the *H. hirsutus* Berlese male is given: „Two chaetae on the ventral side of the palpa point: the outside one — needle-like, and the inner — thornlike, slightly bent.” Figures 2a and 3a represent this particular chaeta which differs considerably in shape from description given by the author and still more so from the drawing.

Although no fundamental relationship between those two gnathosoma structures may be established it may however not be ignored that there is resemblance in oral apparatus of *H. horridus* Mich. and that of *H. hirsutus* Berl.: the strong chitinized maxillae, typical and easy to remark, serving for perforating the mammal



Fig. 4. *Haemogamasus horridus* Mich. ♀. Due to sexual dimorphism very little expressed in gnathosoma of this species, the picture of ♀ coxopodit may illustrate condition in both sexes. Prep. Nos 1300, 1310 and 1324, orig.

skin, are lacking in both cases. Taking into consideration what has been stated above we may consider *H. horridus* Mich. as belonging to that group of *Acarina* in which the perforating organ is formed by a whole set of oral appendices strengthened with well formed chelicerae.

Figure 4 shows the gnathosoma of this species.

Haemogamasus hirsutosimilis Willmann, 1952.

♀♀ and ♂♂ collected correspond exactly to data given in descriptions (Willmann, 1952, Bregetova, 1954, 1955, 1956). Paratypical sternal shield chaetotaxy (up to 37 pairs of chaetae); chelicerae-claws armed with teeth in ♀♀; body and legs chaetae smooth (no „feathering”) in both sexes. In ♂♂ chelicerae-claws are very markedly modified and, in contrast to the normally formed

chelicearæ of the female, they most probably are not functional; their modified structure produces the impression of theratologic deformation. Sexual dimorphism in coxopodit region is not markedly expressed.

H. hirsutosimilis Willm. as the name suggests, resembles *H. hirsutus* Berlese. Idiosoma structure in both species is almost identical: armed and covered with chaetae. Close examination of the mouth apparatus has convinced me that the keen eye of Willmann had once again distinguished between the appearances and the essential of the matter; *R. hirsutosimilis* Willm. 1952 constitutes a form separate from *H. hirsutus* Berl. 1889 indeed.

Gnathosoma, examined ventrally, shows first of all relatively large maxillae, perfectly chitinized and easy to distinguish. Their position resembles very closely, in some preparations at least, that

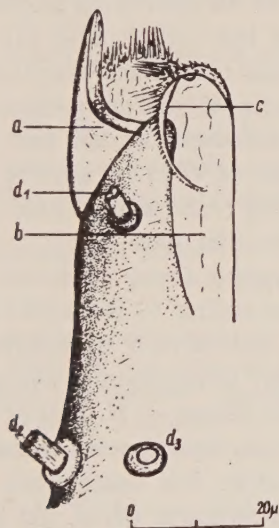


Fig. 5. *Haemogamasus hirsutosimilis* Willm. O. a — maxilla, b — hypostoma, c — laciniae hypostomi, d — hypostomal cheta. Prep. No 1317, orig.

of the chitin ledge known from the description of gnathosoma of *H. hirsutus* Berl.; however the maxillae differ markedly from the weak flake both in structure and form. Instead the rather short laciniae hypostomi, thin and bent, are similar to analogous formations in a quite different species, in *H. nidi* Mich., this fashioning the

whole ventral surface of the oral apparatus into a shape typical of that species group.

This may be clearly seen on figure 5 representing the coxopodit of ♀ *H. hirsutosimilis* Willm.

Discussion of results

The difference stressed above between the „type” *H. nidi* Mich. and the „type” *H. hirsutus* Berl. has, as a result of my study, become more marked on the one hand, but effaced on the other. The difference became more marked as a result of determining the new characteristic of the „type” (b/b/B/b♂), that is the establishment of the typical transformation of maxillae into delicate and weak formations. The difference disappeared, however, when a form was found which according to all examined idiosoma properties belonged to this particular type but which was all the same armed with absolutely typical, strongly chitinized, maxillae found in all *Gamasides* and among others also in the *Acarina*-type (a/a/A/a ♂). We may therefore say that the antithesis of the two elementary groups was somewhat diminished due to Willmann's discovery of the species „*H. hirsutosimilis*”. Very interesting data could be obtained by analyzing this rather peculiar case.

First of all the atypical form of claws in males attracts our attention. The claws, according to Bregetova, 1954 (p. 484), are somewhat similar to *H. nidi* Mich. chelicerae. Second, one is struck by two kinds of similarity in coxopodits where some details resemble *H. hirsutus* Berl. while others — *H. nidi* Mich. Last but not least, the fact seems strange that this species was described relatively late (1952), a few decades after the description of *H. hirsutus* Berl., although it is not rare nowadays (thus, for instance, Bregetova, 1954, was able to collect 4 ♂♂ and 4 deutonymphs from an *Apodemus sylvaticus* L. caught on the Georgian Military Road in the Caucasus on November 13, 1951). How then can the fact be explained that the particular species *H. hirsutosimilis* Willm remained unnoticed by authors up to the second half of the 20 century apart from the detailed analyses of genus *Haemogamasus*?

One answer to this question occurs to me:

H. hirsutosimilis Willm. has appeared newly as a result of spontaneous crossing between two representatives of two „types”,

namely: *H. pontiger* (Berl.) + *H. nidi* Mich. on one side, and *H. hirsutus* Berl. on the other.

This should doubtlessly be corroborated by culture which is the last prove in this sort of study.

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LITERATURE

1. André M. — Ordre des Acariens, in: P. P. Grassé, „Traité de Zoologie”, Paris, v. VI, 1949.
2. Baker E. W. and Wharton G. W. — An Introduction to Acarology, 1952 (Russian ed., Moscow, 1955).
3. Bregetova N. G. — Materiały po faunie kleščeij sem. *Haemogamasidae* v SSSR. Parasit. Sb., 11, 1949.
4. Bregetova N. G. — K faunie gamazovych kleščeij Dalnevo Vostoka. Parasit. Sb., 15, 1953.
5. Bregetova N. G. — Gamazovyje klešči (*Gamasoidea*) rajona sred. tečenija r. Urała. Trudy Zool. Inst. AN SSSR, 16, 1954.
6. Bregetova N. G. — Tablica dla opriedelenija semejstv gamazovych kleščeij nadsem. *Gamasoidea*, in: Klešči gryzunov fauny SSSR, Izd. AN SSSR, 1955.
7. Bregetova N. G. — Gamazovyje klešči. Izd. AN SSSR, 1956.
8. Ewing H. E. — New Mites of the parasitic genus *Haemogamasus*. Proc. Biol. Soc. Washington, 38, 1925.
9. Ewing H. E. — New genera and species of parasitic mites of the superfamily *Parasitoidea*. Proc. US Nat. Mus., 82 (30) 1933.
10. Kozłowski Sł. — Budowa „gnathosomy” *Spinturnix vespertilionis* (L.) w świetle nowych badań. Acta Par. Polonica, 3, 5, 1955.
11. Kozłowski Sł. — *Haemogamasidae* Białowieskiego Parku Narodowego. Wiad. Par., 4, 5/6, 1958.
12. Kozłowski Sł., K. Żukowski. — Badania nad pasożytniczymi *Gamasides* Białowieskiego Parku Narodowego. Wiad. Par., 4, 5/6, 1958.
13. Kozłowski S., K. Żukowski. — Pasożytnicze *Gamasides* Białowieskiego Parku Narodowego. Przegl. Epid. 4758, 1958.
14. Michael D. — On the variation in the internal anatomy of the *Gamasinae*. Trans. Linn. Soc. London, 5 (9), 1892.
15. Mrčiak M. a Rosický B. — K fauně roztočů řádů čmelíkovců (*Parasitiformes*) z území ČSR. Zool. Listy, 5, (19), 2, 1956.
16. Nielzina E. N. — Krysinyj klešč *Bdellonyssus bacoti* (S. Hirst, 1913). Sravnit. par. issl. Izd. AN SSSR, 1951.
17. Rřivora M., Samřinak K. — Zástupce řeledě *Haemogamasidae* jako parasit řlověka ř něk. poznám. k syst. této řeledě. řeskosl. Parasit., 4, 1957.

18. Vitzthum, H. — Milben, *Acari*. In: Tierw .Mitteleur. Bd 3, Lief. 3, 1929.
19. Vitzthum H. *Acarina*. In: Bronn's Kl. u. Ord. d. Tier. Bd. V, Abt. IV, Buch 5, Lief. 1. Leipzig, 1940.
20. Willman C. — Parasitische Milben an Kleinsäugern. Z. Parasitenk., 15, (5), 1952.

STRESZCZENIE

1. Autor podejmuje próbę zweryfikowania pomysłu Ewinga, 1933, który podzielił rodzaj *Haemogamasus* Berl. na dwa podrodzaje. Ewing uważa, iż zrab dawnego rodzaju *Haemogamasus* stanowią gatunki o paranormalnej chetotaksji tarczy sternalnej, natomiast formy o normalnym uszczecinieniu zamyka on w podrodzaju *Euhaemogamasus*. Autor układa klucz dla samic i samców, złożony z 4 par antytetycznych cech dla form żeńskich i 2 par dla samców. Rozbijając cały znany mu z literatury zespół gatunków *Haemogamasus* wg wskazań tego klucza dochodzi on do wniosku, że:

- a) jeden i ten sam gatunek wędruje z grupy do grupy w zależności od przyjętego kryterium, tak że skład grup ulega wymieszaniu,
- b) podobnych do ewingowskich grup jest więcej niż dwie,
- c) samce korelują między sobą inaczej niż samice, wobec czego myśl Ewing'a o naturalnym podziale rodzaju *Haemogamasus* wypada zarzucić.

2. Autor podaje dokładne opisy zbadanych przez siebie gatunków: *H. nidi* Mich., *H. hirsutus* Berl., *H. horridus* Mich. i *H. hirsutosimilis* Willm.

3. Badając morfologię aparatu gębowego zebranych w BPN gatunków autor zauważył, że analiza ta:

- a) z jednej strony pogłębia różnicę między formami o normalnej i paranormalnej chetotaksji, gdyż na ogół z normalnym uszczecinieniem wiąże się normalna budowa maxilli, które u form o chetotaksji paranormalnej są również na ogół zmodyfikowane;
- b) z drugiej zaś strony dane takiej analizy zacierają rzeczoną różnicę, gdyż są gatunki wyposażone w maxille silnie zmodyfikowane przy zachowaniu normalnej chetotaksji tarczy sternalnej.

Po zaznajomieniu się z historią opisanego gatunku autor w oparciu o własne wyniki morfologiczno-porównawcze wysuwa tezę, że *H. hirsutosimilis* Willm. 1952 jest wynikiem krzyżówki między przedstawicielami dwóch „typów”.